

Top @ MPP

ILD SW & Analysis Meeting
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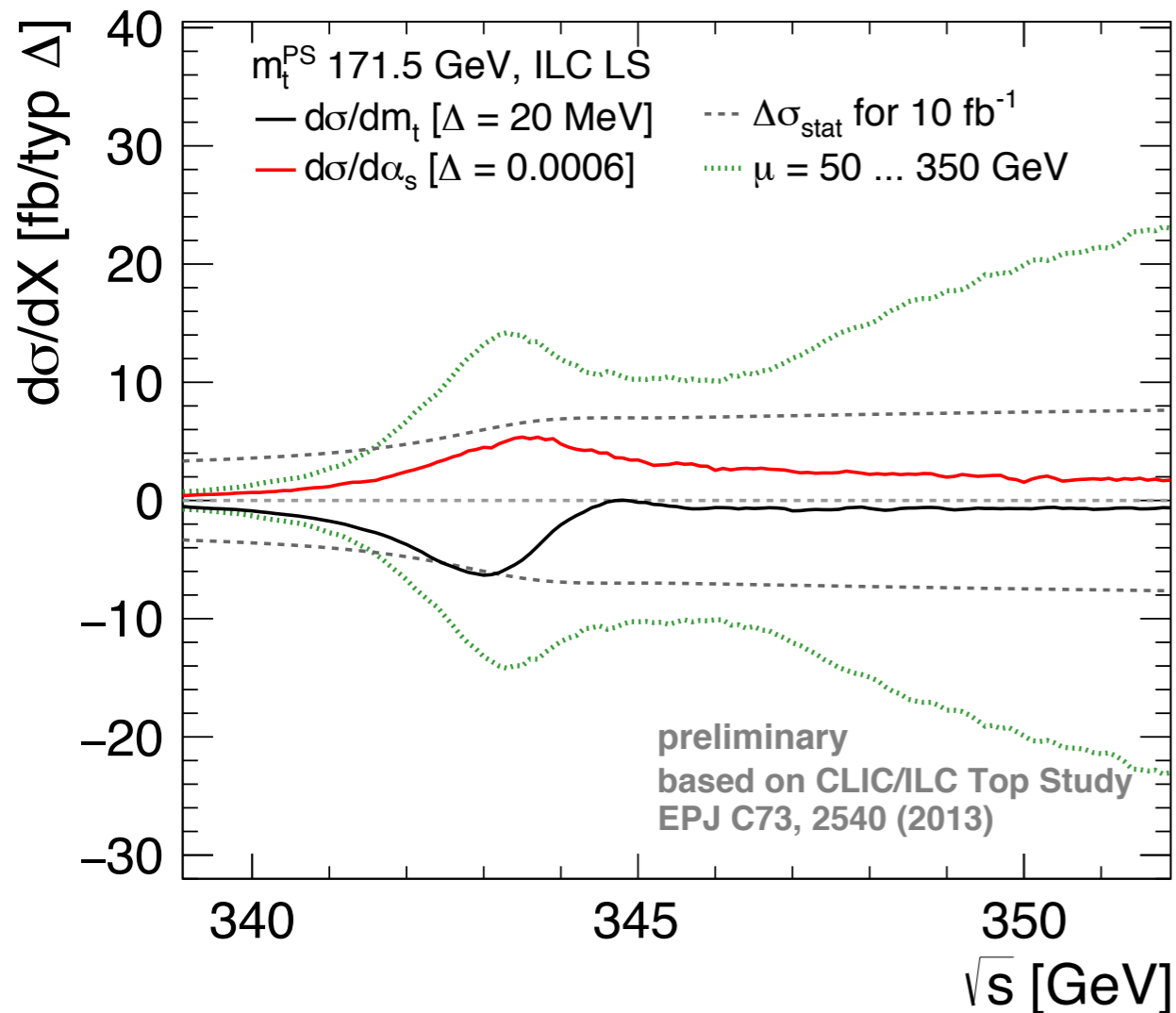
Overview: LC Top Analysis Activities at MPP

- In general: Analyses typically performed in the context of both ILC / ILD and CLIC
- Currently two projects in top physics:
 - Top quark mass in a threshold scan - *F. Simon*
 - very brief status update today, details next week at Top@LC, KEK
 - FCNC top decay: $t \rightarrow c\gamma$ - *N. van der Kolk*
 - study still in early phase, currently slow progress due to other more urgent activities - no results to report yet

Top Quark Mass at Threshold

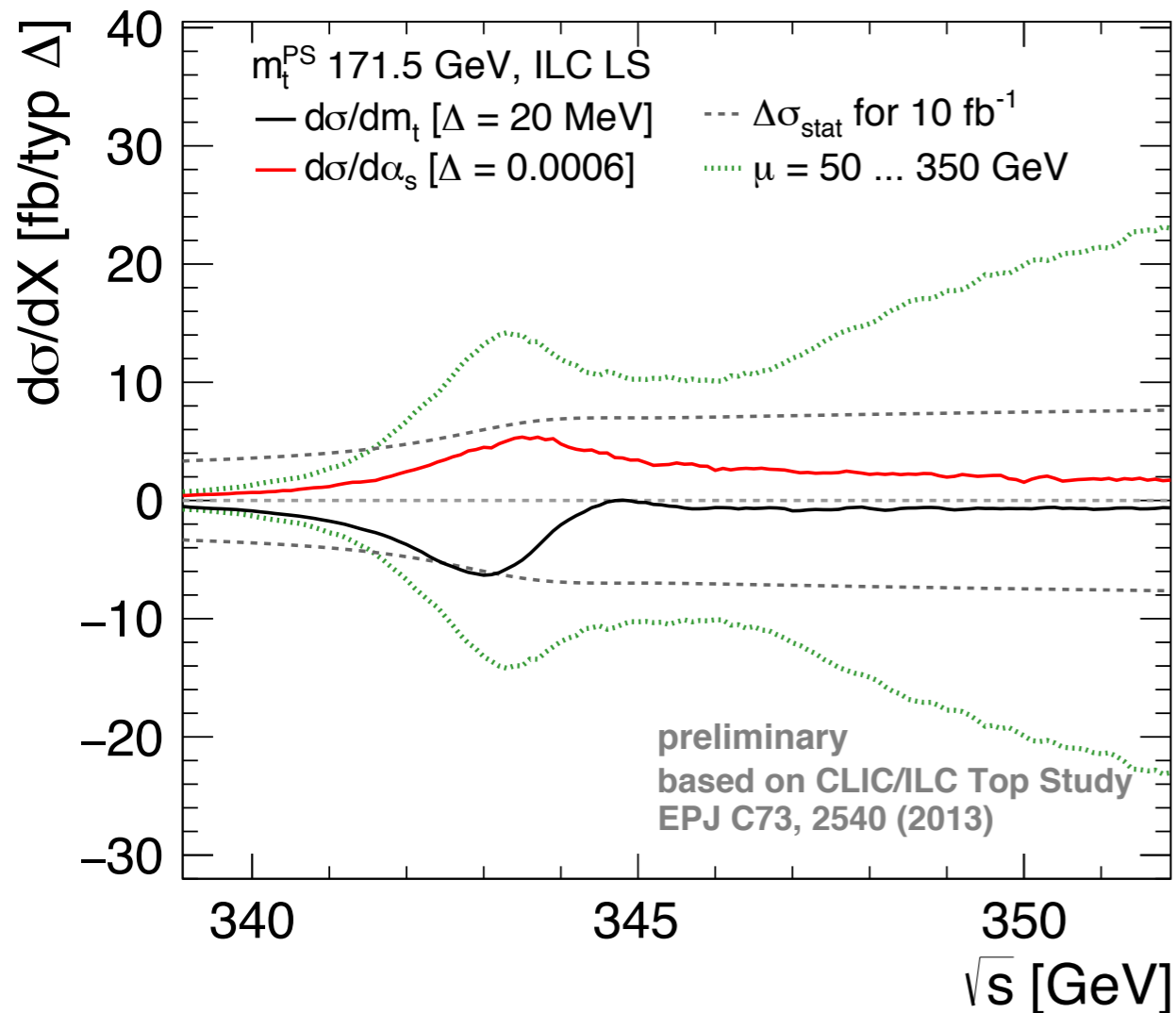
- Building on comprehensive top quark mass study for CLIC in the CDR context: EPJ C73, 2540 (2013)
- The principle: Using signal efficiency and effective background cross section after event selection from full simulations determined at 350 GeV for CLIC_ILD, combined with higher-order calculations of the threshold behavior of $t\bar{t}$ production
 - Implicit assumption, that the signal efficiency does not change in the threshold region
 - Takes the collider luminosity spectrum as input
=> can be performed for arbitrary colliders, done for ILC, CLIC, FCCee
- Current activities: Focused on studying the impact of scale uncertainty of NNNLO QCD calculations performed by Beneke et al.

The Impact of Scale Uncertainties



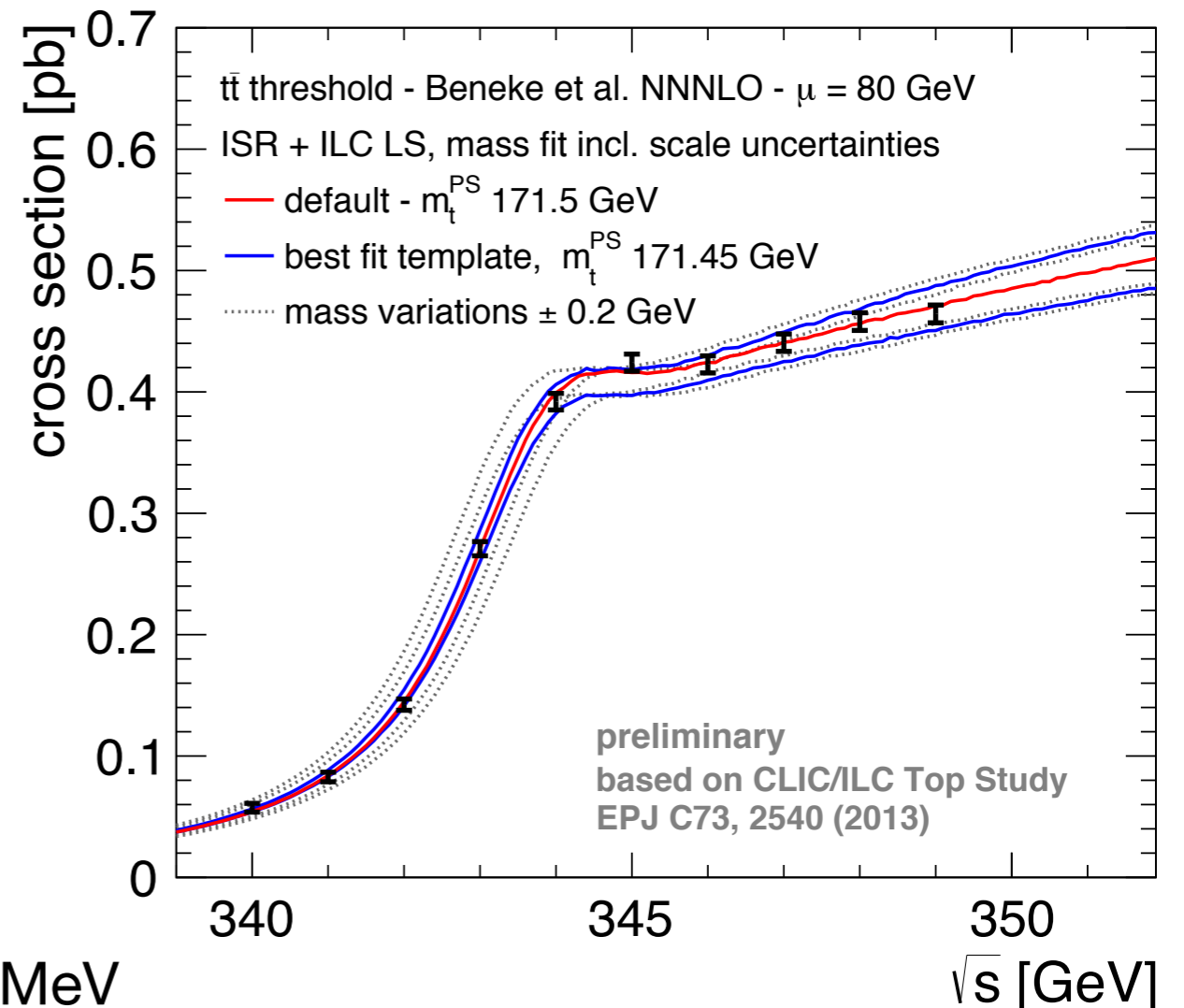
- Scale uncertainties larger than typical statistical uncertainties for 10 fb^{-1} points, and larger than typical variations of top parameters

The Impact of Scale Uncertainties



- Taken into account in the analysis by using templates with built-in scale variations
- ILC results:
 - Fit uncertainty 28 MeV (18 MeV stat)
 - Mass systematic from scale variations 40 MeV

- Scale uncertainties larger than typical statistical uncertainties for 10 fb^{-1} points, and larger than typical variations of top parameters



Top Mass at Threshold: Future Plans

- Expand analysis to other mass schemes -> *very preliminary, not yet understood results next week*
- Study impact of scale uncertainties for other colliders -> *results next week*
- Expand to other top parameters: width, Yukawa coupling

- Increase realism of efficiencies: Energy-dependent study along threshold
- Clarify precision of luminosity spectrum - *student who has started this study got fully absorbed in Belle-II CLAWS activity - timescale unclear*